

Wildland Fire, Fuel Properties

To understand wildland fire, scientists must understand how these fires burn. Each of these cards represents a different fuel property that shapes how wildland fires burn. After you watch the fire demonstrations, record what you noticed about how each fire moved and what did and did not burn. Use these cards to help you define which fuel properties were found in each fire model.

Cut out each card and fold it in half so there is a picture on one side and a description on the other



Fuel Arrangement

Vertical Arrangement: Fuels arranged vertically, such as upright grasses, shrubs and trees, burn with a taller flame that can easily move up into higher fuels, "climbing" the fuel like a ladder.

Horizontal Arrangement: Some fuels lay on the surface of the ground, like fallen trees or branches. When these fuels burn, the flames are often shorter but produce more heat.



Chemical

Some plants produce more flammable chemicals than others. These chemicals are called volatile compounds. These chemicals store energy that is easily converted from chemical energy to heat energy. These include oil, resin, pitch, and wax. Pine trees often have highly flammable pitch, which helps the needles and branches burn more easily. Even moist fuels burn when they have high levels of volatile compounds.



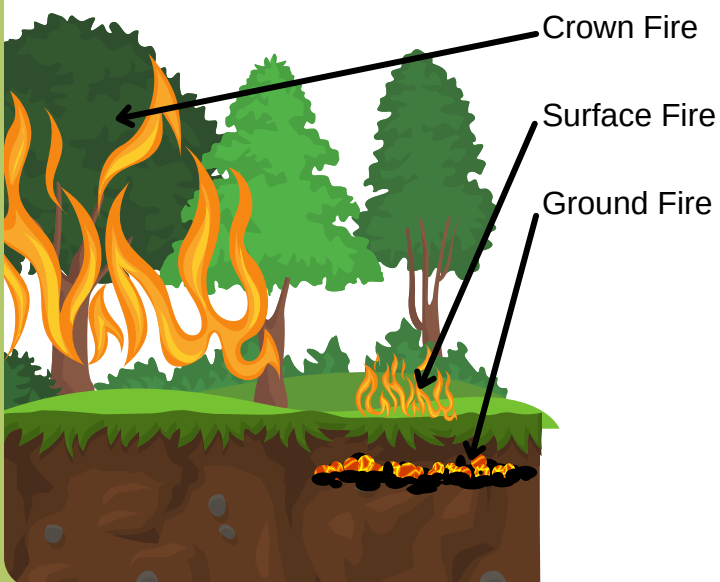
Fuel Size and Shape

Fuels can have different sizes and shapes. The fuel will burn differently based on its size and shape. Grasses burn fairly quickly at a low temperature. Large pieces of wood contain much more stored energy. These take longer to burn and will reach a much higher temperature.



Fuel Moisture

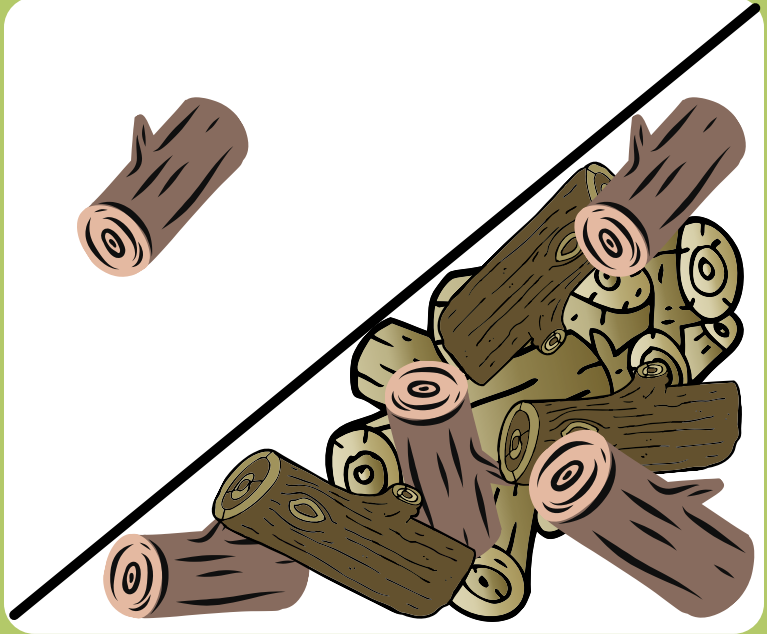
As anyone who has ever tried to start a fire with wet wood will tell you, wet fuel is much more difficult to burn than dry fuel. Areas with dry grasses, leaves, branches, or wood are much more likely to burn than areas with green, moist plants. Wet, green plants often slow the rate at which fire spreads. Dry plants will have a higher rate of spread. This can vary by season, temperature, and drought.



Fire Type

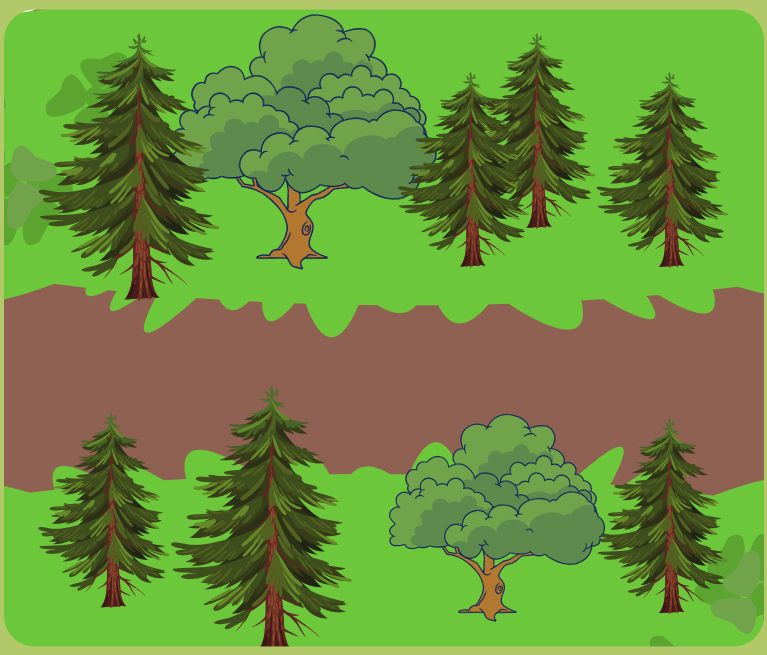
Wildland fires are categorized by where they are burning:

- Ground fires burn the organic matter that is under the leaf litter. This type of fire is uncommon in New Mexico and Arizona.
- Surface fires burn leaf litter, woody debris, grass, and small plants.
- Crown fires burn through the crowns of shrubs and trees.



Fuel Load

The amount of fuel that is available at a site will determine the heat and intensity of the fire. The fuel load is measured by the dry weight of the available fuel in an area. A fire with less available fuel will burn at a lower temperature. A higher fuel load will often lead to a hotter fire.



Fuel Continuity

For a fire to move across the landscape it requires continuous fuels. If there is a break in the fuel, this can prevent the fire from spreading. Some areas with patchy plant growth rarely burn because there is no fuel to carry a fire across the open ground.



Compactness

When you build a camp fire, you build it in a pyramid shape. This allows air to easily circulate around the fuel. The same is true in wildland fires. Fuels that have a loose arrangement let air and oxygen reach the fire. This allows the fire to continue to burn and spread. If fuels are densely packed, there is less available oxygen. With less oxygen the fire is unlikely to continue burning.